

From: Whitson, Amelia [Whitson.Amelia@epa.gov]
Sent: 3/25/2020 9:17:57 PM
To: Goodwin, Cathleen@Waterboards [Cathleen.Goodwin@waterboards.ca.gov]
CC: Moore, Heaven@Waterboards [Heaven.Moore@Waterboards.ca.gov]; Mues, Pascal [Mues.Pascal@epa.gov]
Subject: RE: Request for assistance evaluating an ammonia modelling proposal from City of Eureka
Attachments: Att2-Effluent Mixing Draft TM 2019-11-25.pdf; Att C - RB comments on Evaluation of NH3 Toxicity (rough draft).docx

Hi Cathy,

Was so nice to talk with you earlier today. So glad to hear you and your family are safe and healthy! Hope the working-from-home continues to go smoothly.

Anyway, Pascal very kindly volunteered his time to help with your request. He's an incredible resource on this topic, and he's already very impressed with your review of the documents. He actually already had a chance to put together some initial responses on the documents you'd attached:

Following the same numbering scheme as Cathleen's comments in Attachment C:

- 1.a: We must evaluate how appropriate the Visual Plumes / UM3 model is for this discharge in the context of what modes of dilution the discharger is claiming to prove. In this case, they only seem to be seeking buoyant-plume mixing, aka "initial dilution", which UM3 can provide good results for if carefully parametrized and staying aware of the model's limitations.
UM3 isn't sophisticated enough to take into account complex bottom shape or nearby shorelines of the kind we might expect in Humboldt Bay, much less tidal currents that change over time. The consultant's report does not demonstrate that they carefully considered and protected against those limitations of the model chosen, when they really should show their work.
Because the discharger is only claiming initial, buoyant-plume dilution the results from UM3 / Visual Plumes are not *inherently* invalid. But, when EPA recently faced a similar discharge into a *less-constrained* bay (Pago Pago Harbor in American Samoa), we had to get the modeling re-done in CORMIX and found significant potential for boundary interactions that could reduce effective dilution.
- 1.a.i: A "sensitivity analysis" (i.e. submitting multiple model runs with variations in input parameters, including more than 2 flow rates) would be a normal best practice for modeling a discharge for the first time, and I would wholeheartedly support Cathleen's request here, even if the discharger complains about the additional time and cost.
- 1.b: The consultant's assumption of "zero background level" for Ammonia is probably the single biggest flaw in the analysis. Especially with a narrow-mouthed tidally-influenced system like Humboldt Bay, you would expect plume re-entrainment unless proven otherwise, and that can dramatically reduce effective dilution. Are there any "reference station" data, from this permit or other dischargers, that could be used to get a background value? Also worth double-checking that consistent assumptions were used for the chemical transformation model.
- Skipping to 4.b: The "entrained ambient volume" only comes up in a general description in the report, so there is not a numeric value to report, but in practice yes this is based on how the algorithms in the model work.
- 4.c: UM3 does not produce 3-dimensional graphs of the effluent plume just because the base code of the model dates back to before computers were reasonably capable of rendering a 3-d graph like that. However, for information on "how far from the outfall the mini plumes blend together", see Attachment B to the consultant's report and look for the lines of the model where it says "merging".

Pascal also said he'd be happy to set up a phone call to discuss further with you. I'll leave it to the two of you to set up a time to talk, and no need to involve me (unless you'd like me to help facilitate in any way).

All the best,

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From: Goodwin, Cathleen@Waterboards <Cathleen.Goodwin@waterboards.ca.gov>
Sent: Monday, March 23, 2020 3:56 PM
To: Whitson, Amelia <Whitson.Amelia@epa.gov>
Cc: Moore, Heaven@Waterboards <Heaven.Moore@Waterboards.ca.gov>
Subject: Request for assistance evaluating an ammonia modelling proposal from City of Eureka

Hi Amelia:

I hope you are well during the current COVID-19 emergency. Are USEPA staff working from home at this time?

I believe I spoke with you about the City of Eureka's proposal to use modelling to try to demonstrate that ammonia does not have the potential to exceed effluent limitations for ammonia. I just can't remember how much we discussed this. The City submitted the proposal in December 2019. I am just getting back to working on Eureka after working on getting the Santa Rosa permit out for public comment. I need to provide comments to the City on their proposal and whether such an approach is even an option.

Regional Board staff wish to request USEPA assistance in reviewing the City's proposal. Heaven Moore talked with someone from USEPA when she attended the NPDES Permit Writers' Training earlier this month. That person recommended that we contact Pascal Mues indicating that he has modelling background. Is it appropriate for me to contact Pascal directly to make this request? If not, how do you recommend that I request USEPA assistance for review of the City's technical memorandum? We are interested in providing the City with feedback soon. We want to be able to tell them whether this approach is an option for demonstrating that ammonia is not (or is) exceeding effluent limitations and, if so, identify the minimum requirements and appropriate assumptions to include in the evaluation to ensure a robust analysis. We also need guidance on appropriate modelling software.

I have attached the City's technical memorandum as well as a list of comments that I developed when I reviewed the technical memorandum.

I look forward to hearing from you.

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The governor of California has issued a statewide shelter in place order due to the COVID-19 emergency. The Water Boards are continuing day-to-day work protecting public health, safety, and the environment. However, most staff are working remotely and we continue to check email and voicemail regularly. Thank you and stay healthy and safe.